

110

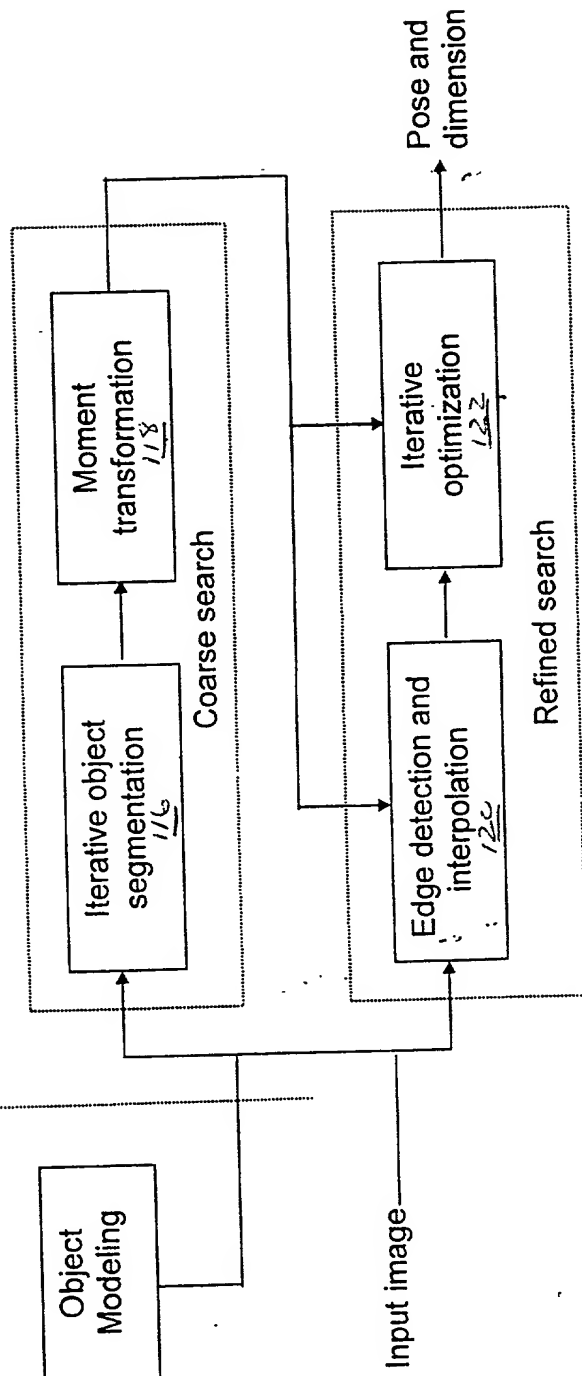
112

Offline process

Object Modeling

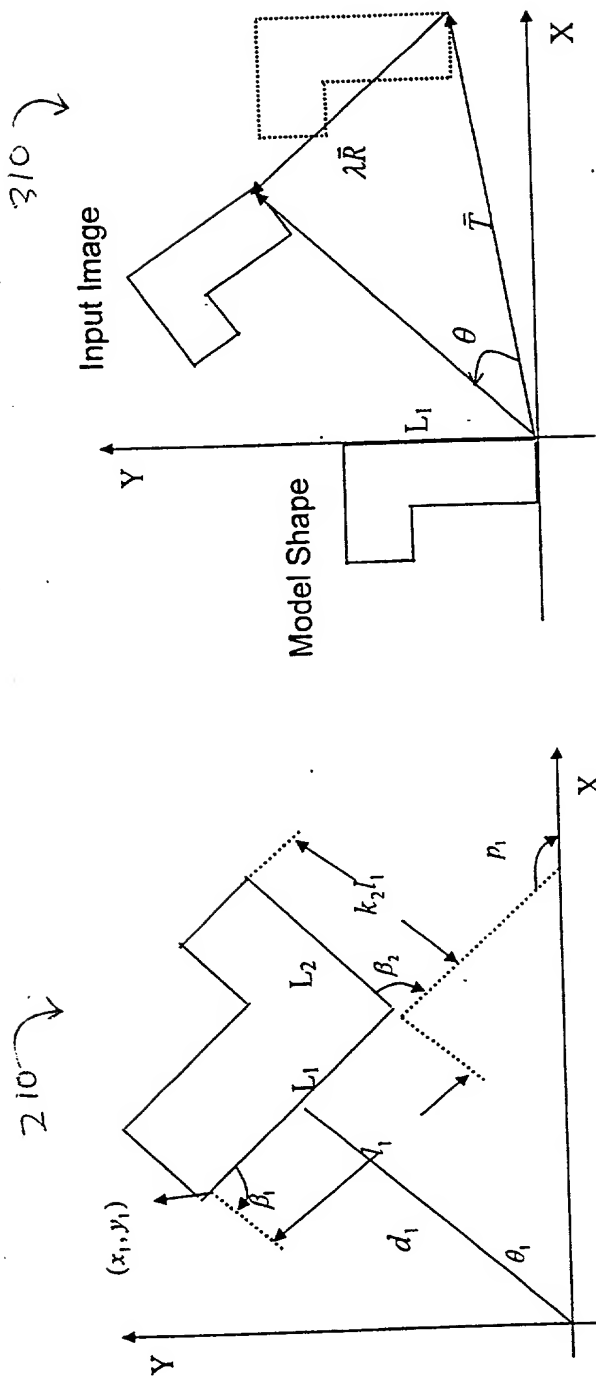
114

Runtime Process



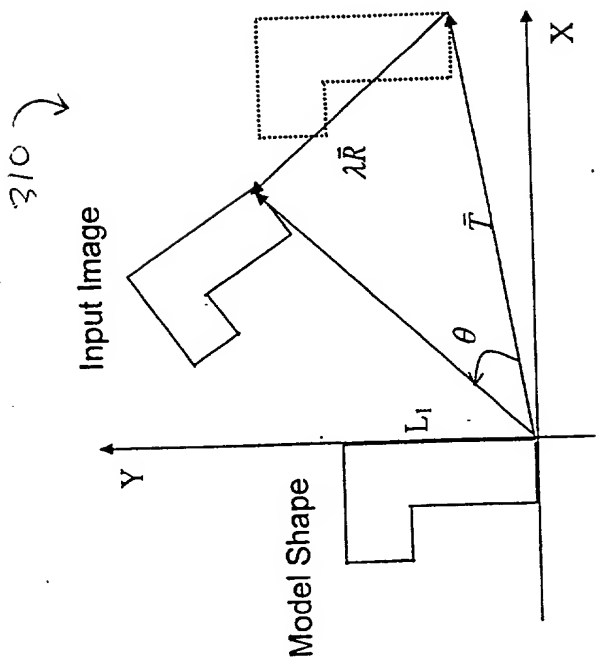
The model-based algorithm for localization and measurement of miniature SMC objects.

Fig. 1



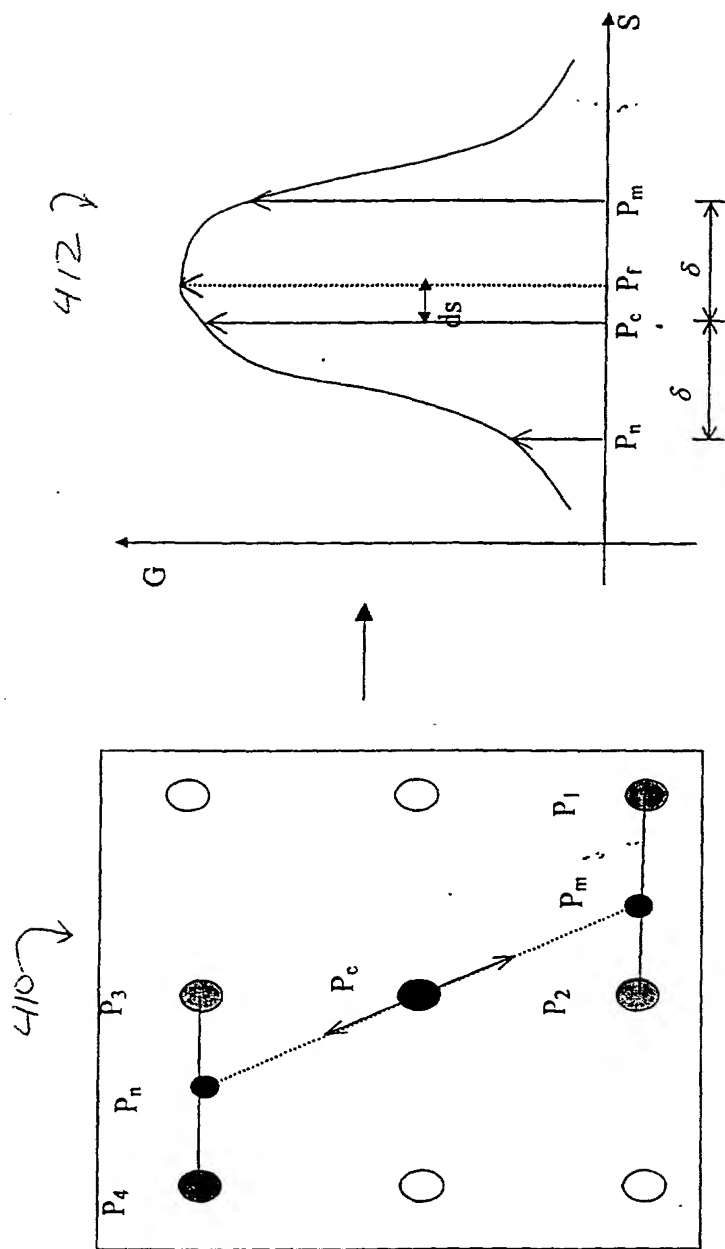
A polygon defined by the variables  
 $(l_1, x_1, y_1, \theta_1, k_1, \beta_1)$

Fig. 2



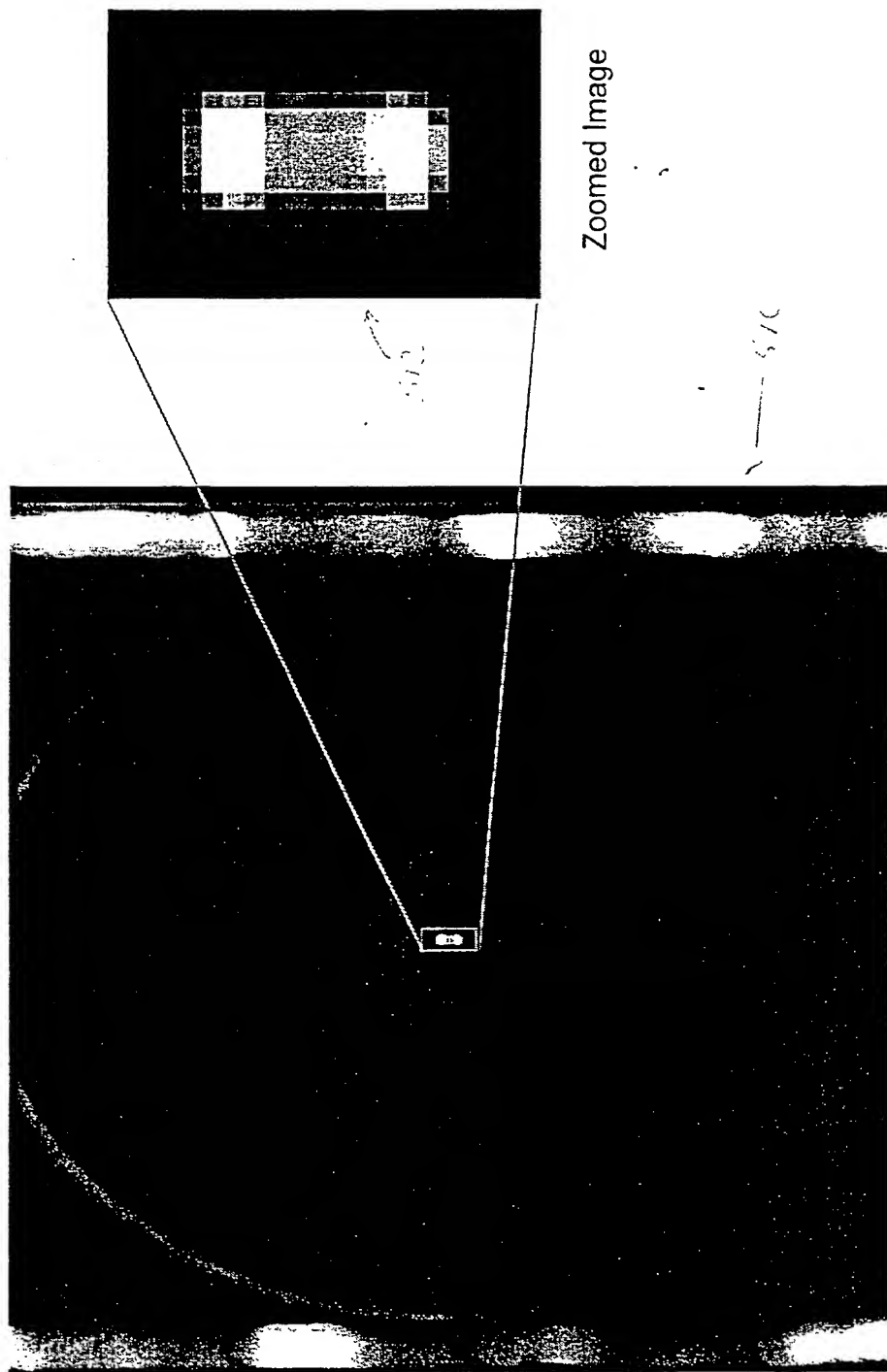
A linear transformation between the model shape and the input image can be parameterized by translation, rotation, and scaling.

Fig. 3



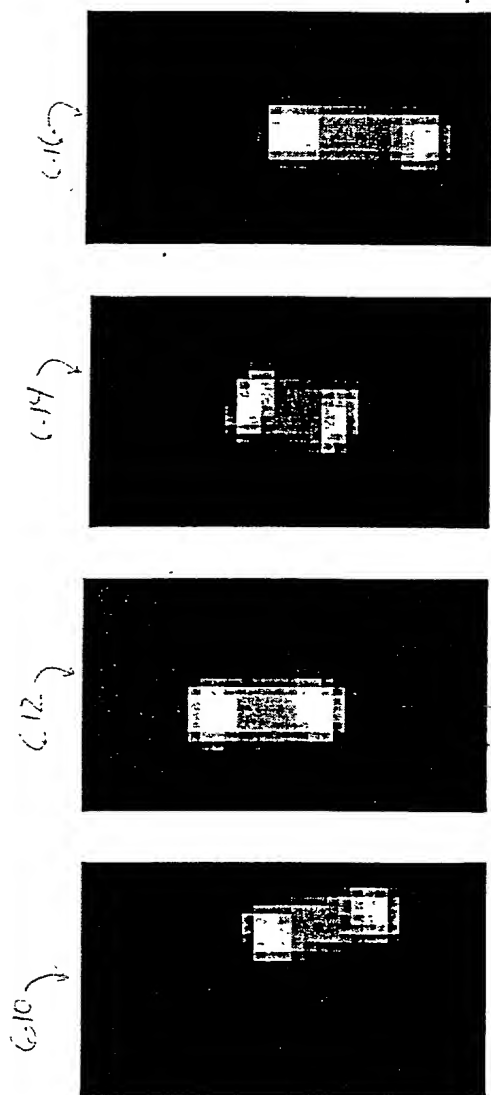
## Bi-Linear Interpolation





A typical image of the miniature SMC object acquired from a pick-and-place system

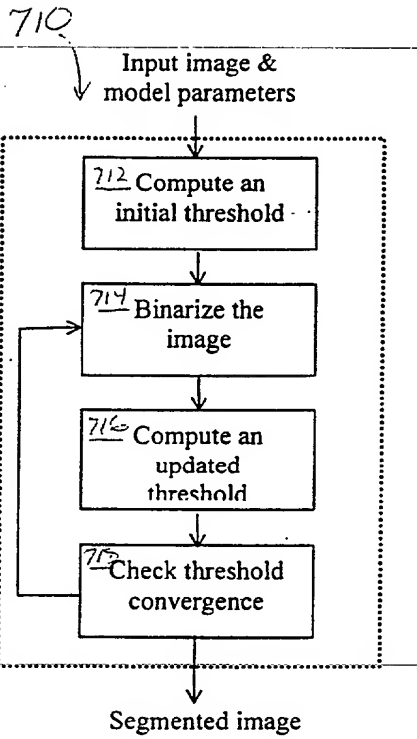
Fig. 5



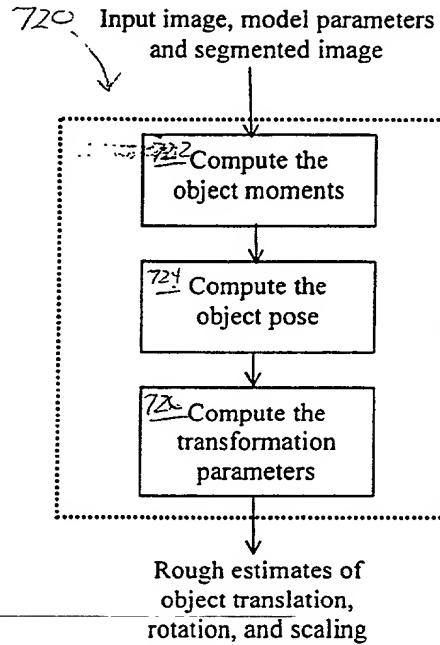
Images synthesized from our simulation process

Fig. 6

## Flow Charts of Coarse Search



Object segmentation flow chart

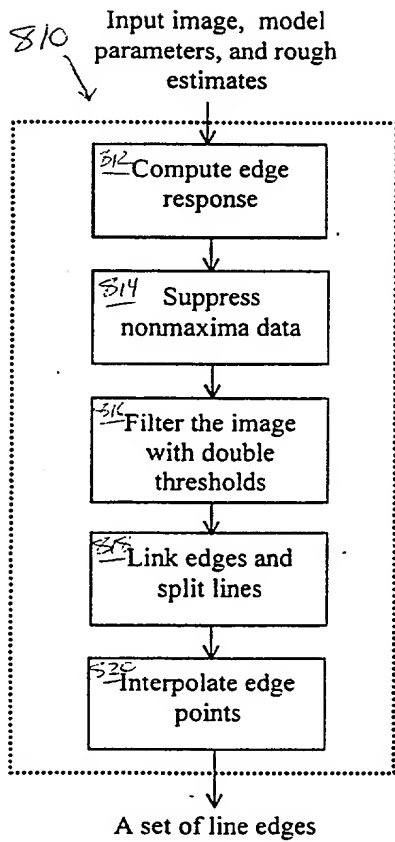


Moment transformation flow chart

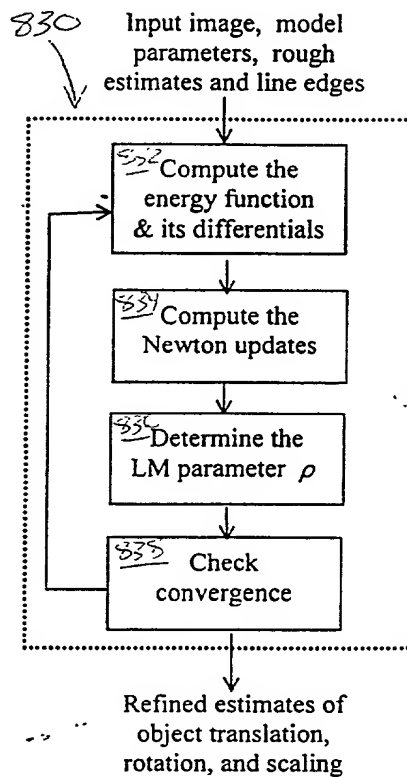
Fig. 7A

Fig. 7B

## Flow Charts of Refined Search



Edge pixel detection flow chart



Pose optimization flow chart

Fig. 8A

Fig. 8B